## REMARKS

Claims 1-18 are currently pending in the application. By this amendment, claims 6 and 10 are amended for the Examiner's consideration. Support for the amendment(s) is provided in at least Figure 1 and the description thereof. No new matter is added. Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

***Allowed Claims***

Applicants appreciate the indication that claims 4, 5 and 14 contain allowable subject matter. However, Applicants submit that all of the claims are in condition for allowance for the following reasons.

***35 U.S.C. §112 Rejection***

Claims 6-10 were rejected under 35 U.S.C. §112, 2nd paragraph. This rejection is respectfully traversed.

Claim 6 is amended to recite that the throttle is in fluid communication with the plunger. This feature is shown in Figure 1, for example. Claim 10 is amended to provide proper antecedent basis to the claim terms.

However, Applicants submit that there is proper antecedent basis for the features of claim 9. Specifically, "the throttle" and "the intensifier" are recited in claim 7, for which claim 9 depends thereon. Accordingly, Applicants are of the opinion that the recitation of features in claim 9 are clear and definite.

Accordingly, Applicants respectfully request that the rejection over claims 6-10 be withdrawn.

***35 U.S.C. §102 Rejection***

Claims 1-3, 6-13 and 15-18 were rejected under 35 U.S.C. §102(b) for being anticipated by U. S. Patent No. 4,527,737 to Deckard. This rejection is respectfully traversed.

The present invention is directed to a fuel injector capable of providing a small pilot quantity of fuel. The small pilot quantity of fuel allows for a more efficient fuel injection. In one aspect of the invention, the invention is directed to a hydraulically controlled injector which has a spool slidable between a first position and a second position and an open and closed solenoid positioned on respective sides of the spool. In another embodiment, a plunger includes a cross bore and a longitudinal bore in communication between the high pressure chamber and the fuel bore. In yet another embodiment, a check disk has a fuel bore extending between the upper surface and the lower surface and throttle providing fluid communication from the upper surface of the body to the fuel bore. Also, in another aspect, the invention includes an intensifier body having a fuel bore adapted to provide fuel to a nozzle of the fuel injector and a throttle in fluid communication with the fuel bore and a high pressure fuel chamber. The throttle has a smaller cross section than the fuel bore. However, Deckard does not show these features of the independent claims.

By way of example, Deckard does not show a hydraulically controlled injector which has a spool slidable between a first position and a second position and an open and closed solenoid positioned on respective sides of the spool. Instead, Deckard shows an electromagnetic unit fuel injector. In this type of implementation, the opening and closing movement of a differential valve 60 is controlled by a solenoid actuated control valve, generally designated 80. As described at col. 7,

> Flow from the passage 83 to the spill cavity 85 is controlled by the control valve 80 which is in the form of a hollow, pressure balanced poppet valve .... The control valve 80 is normally biased in a valve opening direction, downward with reference to FIG. 1, by means of a coil spring 93 .... The upper free end of the valve stem 80b extends loosely through a central aperture 95a in the spring retainer 95 and has the armature 94 of a solenoid assembly, generally designated 100, fixed thereto as by a screw 98.

In operation, as described in columns 9 and 10, the injection mode is initiated by energization of the solenoid coil 108 to effect closure of the control valve 80. With this control

valve 80 closed, the pressure P2 in the pressure control chamber 72 rapidly approaches the pressure P1. Since D2 is larger than D1, the force F2 will be greater than that of force F1. Due to the differences in the forces, the spool valve 60 will move to its closed position. Upon deenergization of the solenoid coil 108, injection will terminate rapidly since the pressure P2 in the pressure control chamber 72 will then again be dumped via the now open, control valve 80 to drain pressure Po.

However, contrary to the Examiner's understanding, Deckard does not include a spool with solenoids on respective sides thereof. This simply is not a requirement of an electromagnetic unit fuel injector as shown by Deckard. Instead, the spool 60, as described above, is controlled by the control valve 80, positioned remote from the spool 60, and more particularly within the solenoid assembly 100.

In addition, Deckard does not show a plunger having a cross bore and a longitudinal bore. The Examiner, however, argues that this feature is shown in Figure 1. Applicants submit, though, that Deckard shows a conventional plunger depicted as reference numeral 2. It is noted that the spill cavity 85 is in flow communication via a passage 86 to an annular groove 87, formed in cylinder wall 2 so as to encircle the plunger 3, and then via a radial passage 88 and an downward inclined passage 90 with the supply/drain chamber 20. (See, col. 7, lines 23-30.) But this does not amount to a plunger with a cross bore and a longitudinal bore.

Moreover, Deckard does not show a check disk having a fuel bore extending between the upper surface and the lower surface and throttle providing fluid communication from the upper surface of the body to the fuel bore. Instead, Deckard shows a director cage 17 having a key-shaped recess 28 in its upper surface. The enlarged circular portion of this recess is axially aligned with the pump chamber 8 and with circumferentially spaced apart passages 30 aligned for communication with the bored passage 25 so as to define the discharge end of the inlet passage. A passage 82 also extends through director cage 17.

Additionally, Deckard shows a valve cage 16. The valve cage includes a valve 26 and controlled bore passage 25. Additionally, the valve cage 16 includes upwardly inclined passage 81 in valve body 16 that communicates at its lower end with chamber 72 and at its upper end

with a passage 82 extending through director cage 17 so as to be in flow alignment with the lower end of a suitable drain passage 83 provided in body 1. Pressurized fuel in the high pressure passage 31 will also flow via throttle orifice passage 73 into the pressure control chamber 72 and then flow from this chamber 72 to drain at a controlled rate so that fuel in the pressure control chamber 72 will be at a pressure P2.

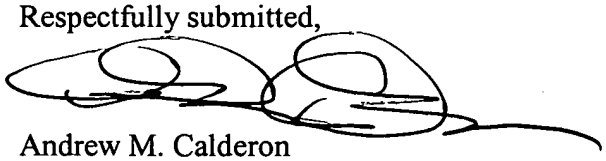
Lastly, the invention includes an intensifier body having a fuel bore adapted to provide fuel to a nozzle of the fuel injector and a throttle in fluid communication with the fuel bore and a high pressure fuel chamber. The throttle has a smaller cross section than the fuel bore. But, again this feature is not shown in the Deckard reference, as discussed above.

Accordingly, Applicants respectfully request that the rejection over claims 1-3, 6-13 and 15-18 be withdrawn.

## CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for further extensions of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 23-1951.

Respectfully submitted,



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